

What is claimed is:

- 1 1. A communications network comprising:
2 a connection-oriented subnetwork;
3 a permanent topology of routers coupled to the subnetwork and
4 interconnected by virtual circuits, the routers further comprising:
5 means for calculating a shortcut path through the subnetwork;
6 a forwarding table comprising a first entry along a path through the
7 permanent topology and a second entry along the shortcut path; and
8 means for establishing a virtual circuit to another router along the
9 shortcut path;
- 1 2. The communication network of claim 1 wherein the virtual circuits
2 interconnecting the permanent topology of routers are permanent virtual circuits.
- 1 3. The communication network of claim 1 wherein the shortcut is an
2 intra-area shortcut.
- 1 4. The communication network of claim 1 wherein the shortcut is an
2 inter-area shortcut.
- 1 5. The communication network of claim 1 wherein the routers further
2 comprise means for receiving and processing link state packets containing connectivity
3 information broadcast by another router.

1 6. The communication network of claim 1 wherein the routers further
2 comprise means for receiving and processing link state packets containing shortcut
3 information broadcast by another router.

1 7. The communication network of claim 1 wherein the subnetwork is a
2 non-broadcast multiple access network.

1 8. The communication network of claim 1 wherein the subnetwork is an
2 ATM network.

1 9. A method of operating a router in a communication network coupled
2 to a connection-oriented subnetwork comprising the steps of:
3 receiving a link state packet;
4 using information in the link state packet to compute a permanent path to a
5 destination address;
6 using information in the link state packet to compute a shortcut path
7 through the connection-oriented subnetwork to the destination address; and
8 storing in a forwarding table
9 a first entry to a router along the permanent path and
10 a second entry to a router along the shortcut path through the
11 connection-oriented network.

1 10. The method of claim 9 wherein the shortcut path through the
2 connection-oriented network is to a router on the permanent path to the destination
3 address.

1 11. The method of claim 9 further comprising the step of setting up a
2 virtual circuit along the shortcut path through the connection-oriented network to the
3 destination address.

1 12. The method of claim 9 wherein the subnetwork is a non-broadcast
2 multiple access network.

1 13. The method of claim 9 wherein the subnetwork is an ATM network.

1 14. A method of operating a router in a communication network having a
2 plurality of interfaces to at least one connection-oriented subnetwork comprising the
3 steps of:

4 assigning a number to each of the interfaces;

5 grouping the interfaces into connectivity classes;

6 encoding information identifying the interfaces and the connectivity
7 classes into a link state packet; and

8 transmitting the link state packet to other routers in the communication
9 network.

1 15. The method of claim 14 wherein the link state packet is an OSPF link
2 state advertisement.

1 16. The method of claim 14 wherein the link state packet is in an opaque
2 format.

1 17. The method of claim 14 wherein the subnetwork is a non-broadcast
2 multiple access network.

1 18. The method of claim 14 wherein the subnetwork is an ATM network.